# UNITED STATES PATENT AND TRADEMARK OFFICE **CERTIFICATE OF CORRECTION**

PATENT NO.

: 6,891,462 B2

Page 1 of 7

**APPLICATION NO. : 10/667386** 

INVENTOR(S)

: May 10, 2005 : Andoh et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

The title page showing the illustrative figure should be deleted to be replaced with the attached title page.

The drawing sheet, consisting of Figs. 4a-4e, should be deleted to be replaced with drawing sheet, consisting of Figs. 4a-4e, as shown on the attached page.

Title Page

In the title page, in Field 56, under the heading U.S. PATENT DOCUMENTS, please add

--4,873,757

10/1989

Williams--.

**Drawings** 

Replace drawings sheets 1, 2, 3, 4, and 9 with the drawing sheets shown on the attached pages.

Signed and Sealed this

Twelfth Day of December, 2006

JON W. DUDAS Director of the United States Patent and Trademark Office

# (12) United States Patent

(10) Patent No.: (45) Date of Patent:

US 6,891,462 B2 May 10, 2005

Andoh et al.

# (54) HIGH-Q INDUCTOR FOR HIGH FREQUENCY

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(\*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/667,386

(22) Filed: Sep. 23, 2003

(65) Prior Publication Data

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# Related U.S. Application Data

(62) Division of application No. 10/043,222, filed on Jan. 14, 2002, now Pat. No. 6,664,882, which is a division of application No. 09/454,610, filed on Dec. 7, 1999, now abandoned.

# (30) Foreign Application Priority Data

Dec.	11, 1998	(JP)	H10	3-353078
(51)	Int. Cl.7	.,	Но	1F 5/00
(52)	U.S. Cl.	••••		336/223
(58)	Field of	Search	336/2	00, 232,
• •				336/223

# (56) References Cited

#### U.S. PATENT DOCUMENTS

3,798,059	A	3/1974	Astle et al.	
4,494,100	A	1/1985	Stengel et al.	
4,583,099	Α	4/1986	Reilly et al.	
4 626 R16	Δ	* 12/108K	Rhunkin et al	336/102

4,641,118	A		2/1987	Hirose et al.
5,382,829	Α	٠	1/1995	Inoue 257/659
5,398,400	A	٠	3/1995	Breen 29/602.1
5,497,337	A		3/1996	Ponnapalii et al.
5,656,849	Α		8/1997	Burghartz et al.
6,037,649	A		3/2000	Liou
6,136,458	A		10/2000	Inoue
6,268,778	B1		7/2001	Mucke et al.
6,355,535	<b>B</b> 2		3/2002	Liou
6,366,192	<b>B2</b>	*	4/2002	Person et al 336/200
6,426,267	B2		7/2002	Lion

#### FOREIGN PATENT DOCUMENTS

BP	U484538		12/1991	
JP	409270332	Α	1/1997	
wo	WO 91/19303		12/1991	
wo	WO 9119303	A1	• 12/1991	H01F/17/00

#### OTHER PUBLICATIONS

Article Entitled "Design and Simulation of Film Transformer on Flexible Polyamide Film in Very High Frequency Range" by H. Tsujimoto, IEEE Transaction on Magnetics, vol. No. 4, Jul. 1998.

H. Tsajimoto, "Design and Simulation of Film Transformer on Flexible Polyamide Film in Very High Frequency Range", IEEE Transactions on Magnetics, vol. 34, No. 4, Jul. 1998, pp. 1357–1359.

\* cited by examiner

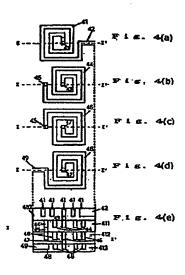
Primary Examiner-Anh Mai

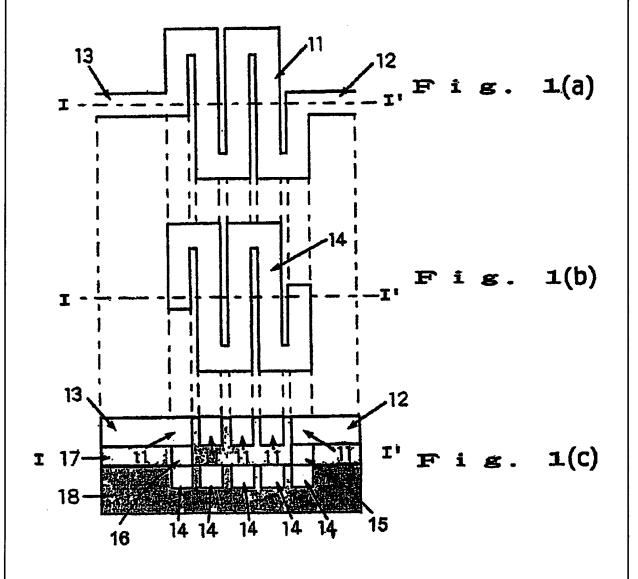
(74) Attorney, Agent, or Firm-Smith, Gambrell & Russell, LLP

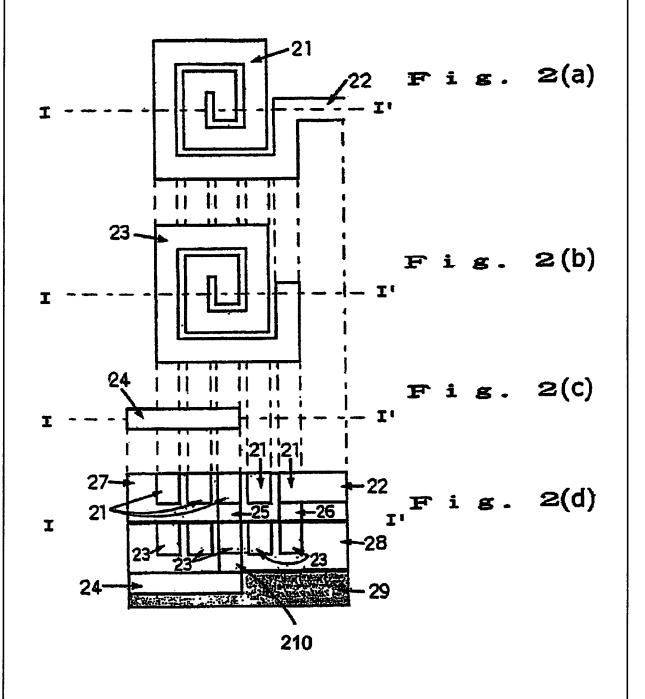
# (57) ABSTRACT

A high-Q inductor for high frequency, having a phurality of inductor elements formed in a plurality of IC wiring layers with a connection formed therebetween. The directions of the magnetic fields generated by the respective inductor elements are substantially the same. With this construction, the section of the inductor is increased reducing the serial resistance component and an influence of a skin effect in a high-frequency range is eliminated increasing the Q value.

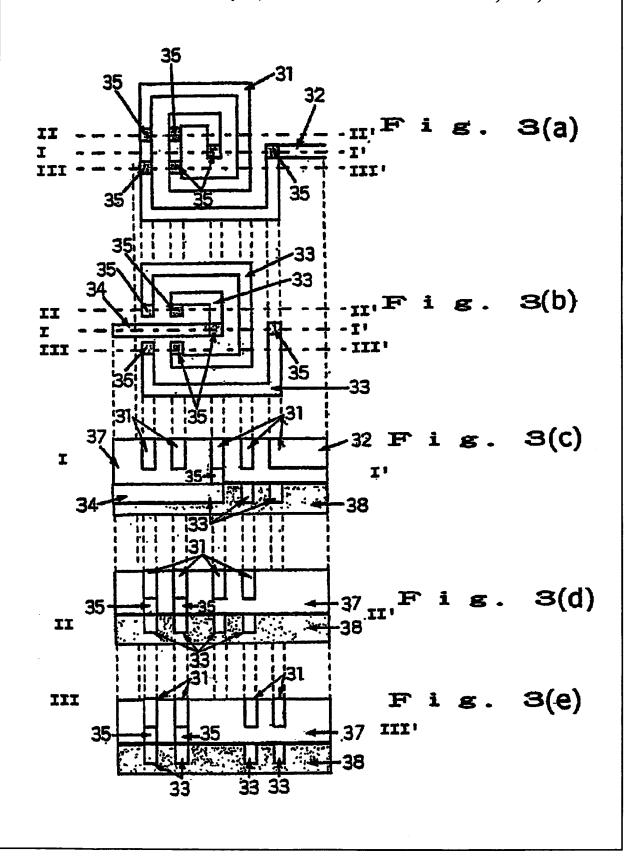
## 1 Claim, 9 Drawing Sheets







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